

Fig. 1

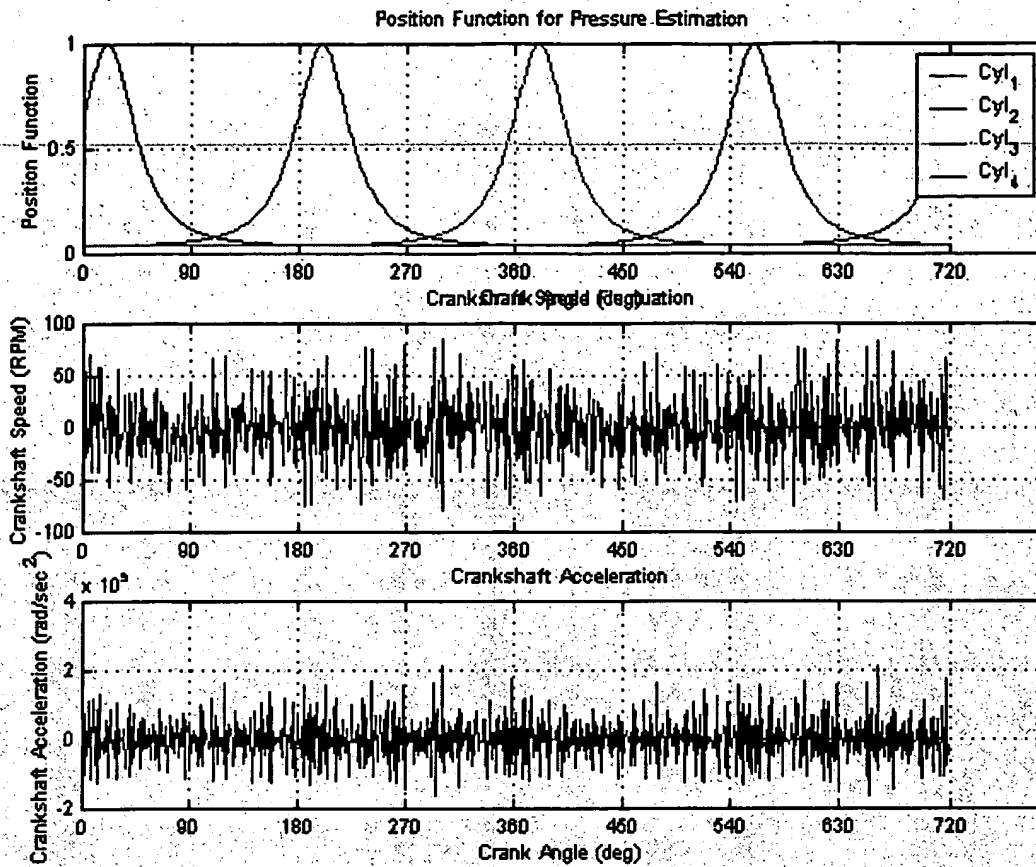


Fig. 2

Measured and Estimated In-Cylinder Pressure,
Speed = 2000 RPM & Load Torque = 30 lb-ft

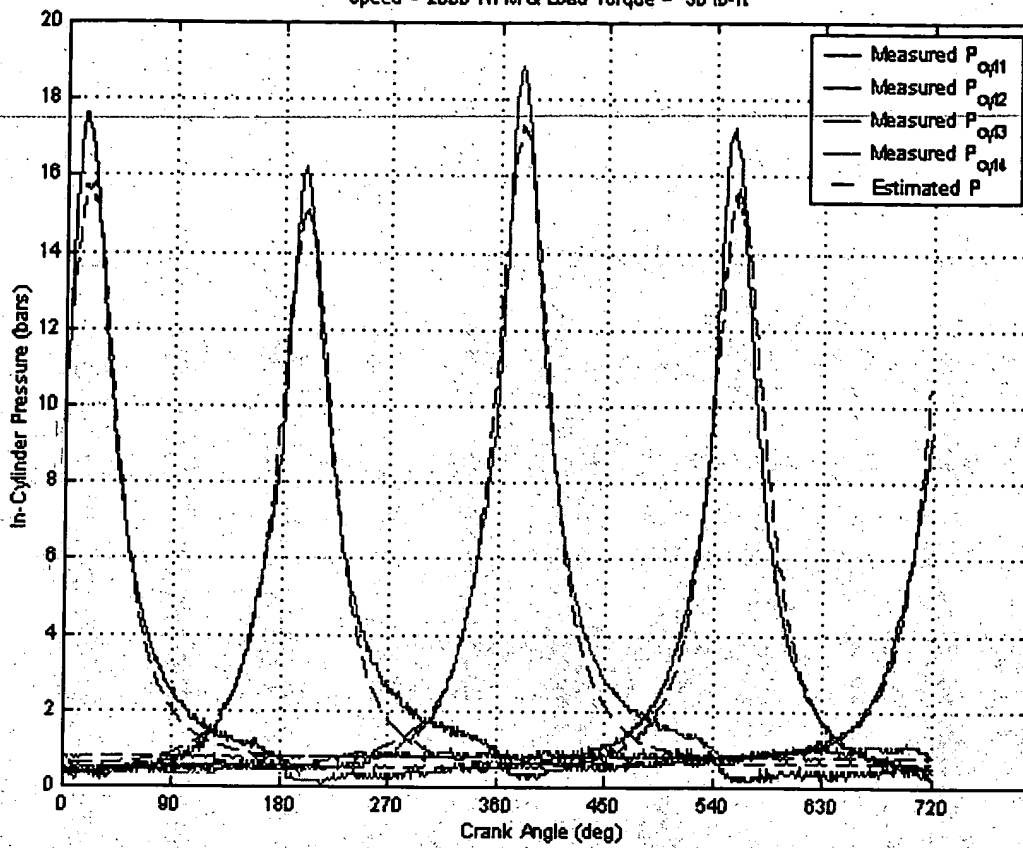


Fig. 3

Measured and Estimated In-Cylinder Pressure,
Speed = 2000 RPM & Load Torque = 30 lb-ft

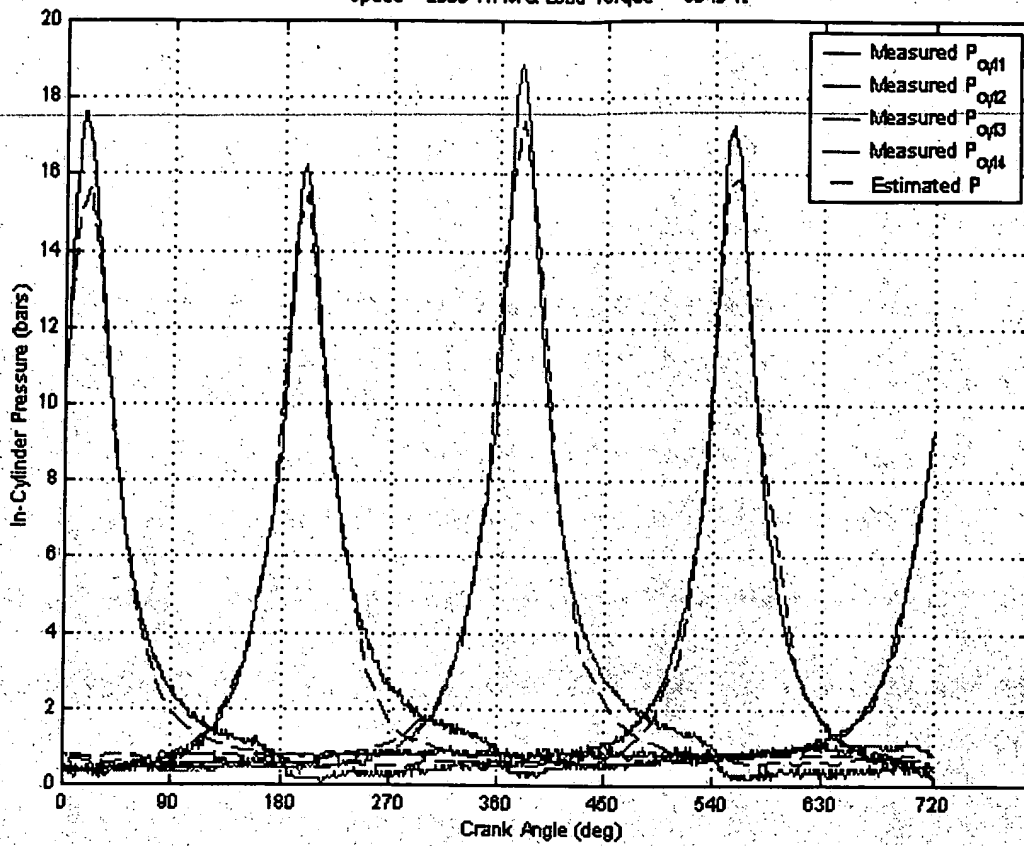


Fig. 4

Indicated Torque for Individual Cylinders
Speed = 2000 RPM & Load Torque = 30 lb-ft

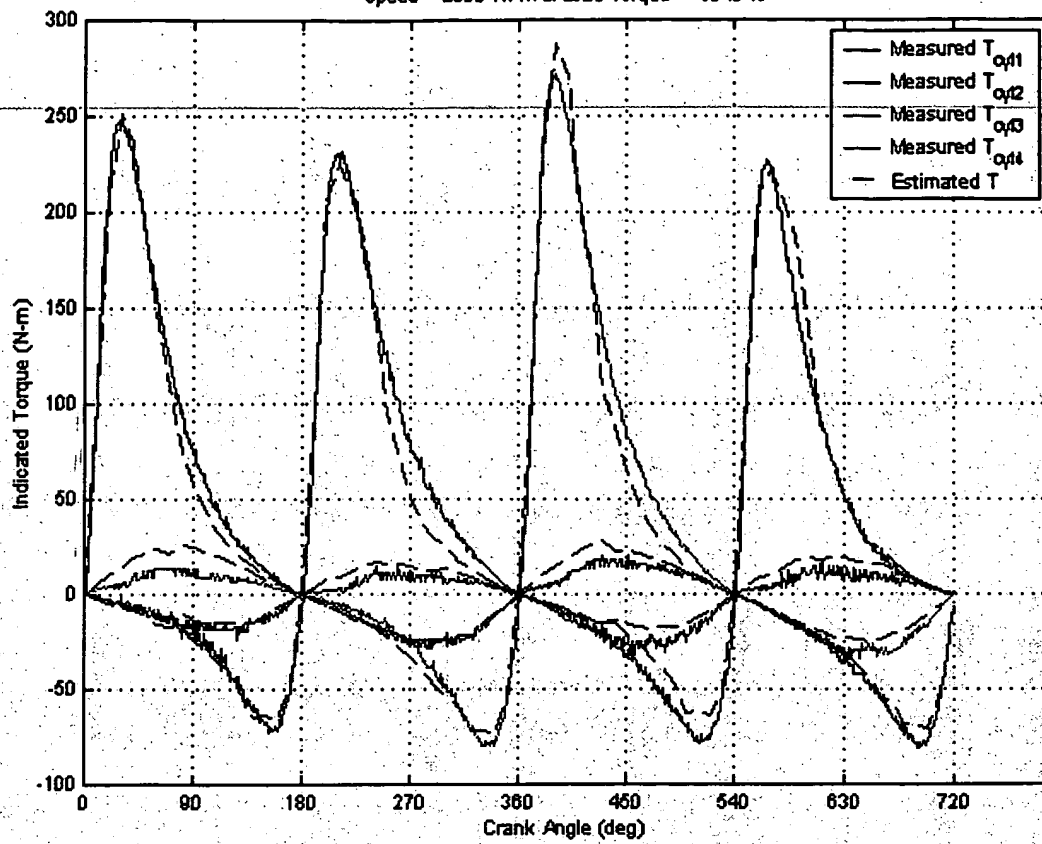


Fig. 5

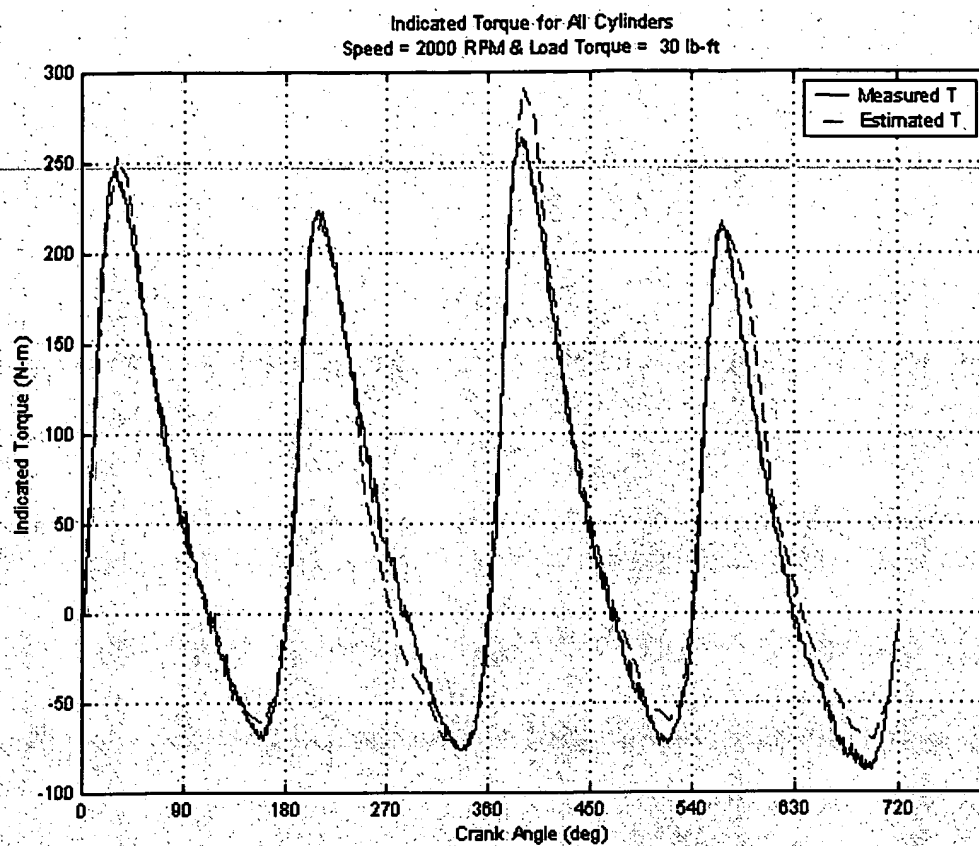


Fig. 6

PART 1: Measured and Estimated Individual Cylinder Torque;
Speed = 2000 RPM & Load Torque = 30 lb-ft

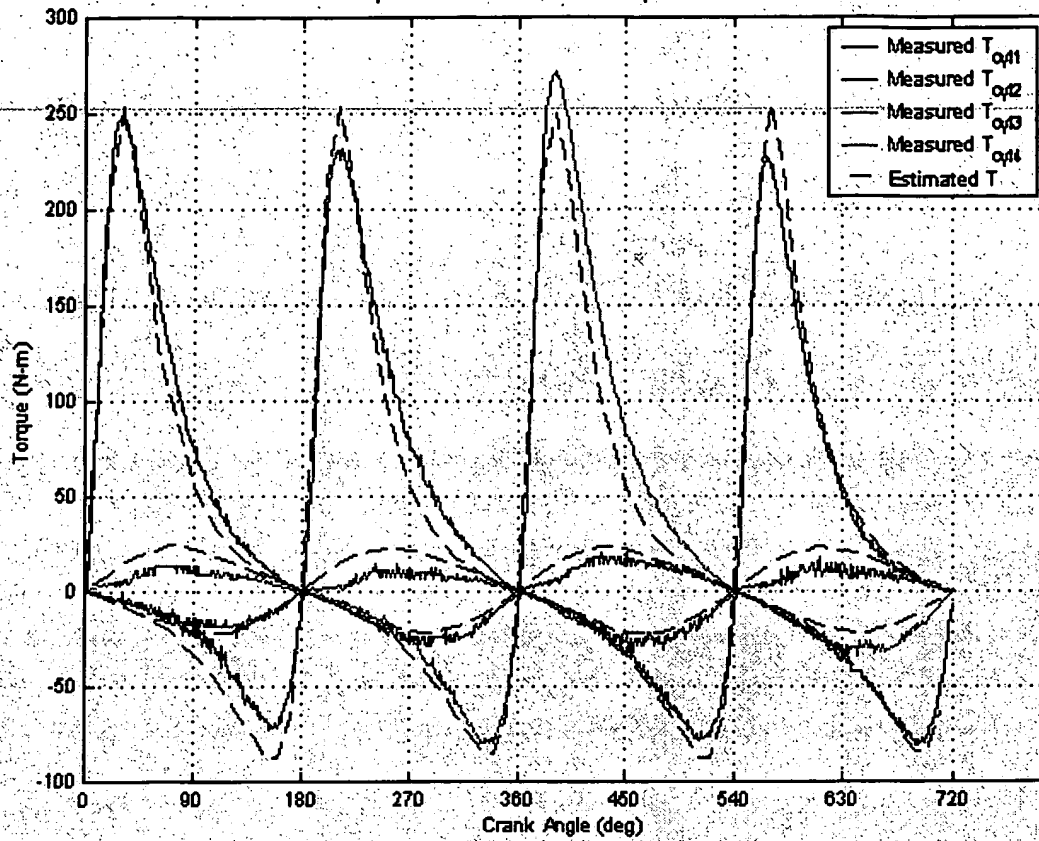


Fig. 7

PART 2: Sum of Individual Cylinder Torque
Speed = 2000 RPM & Load Torque = 30 lb-ft

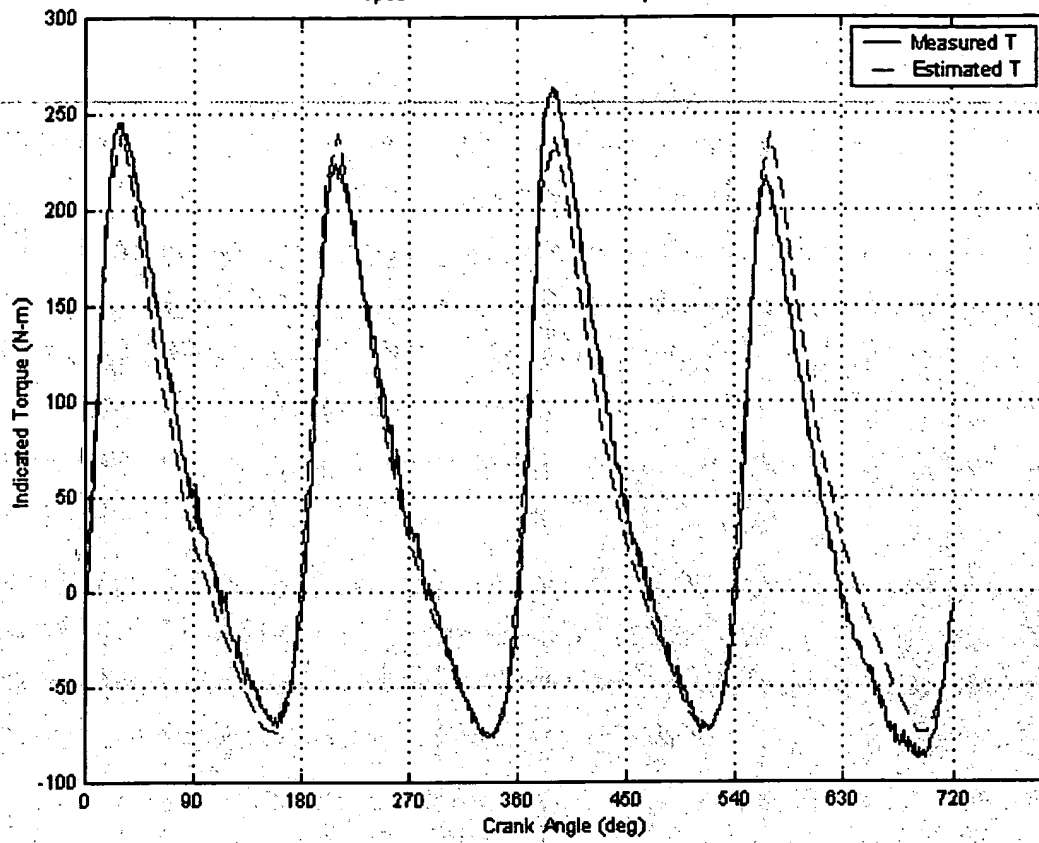


Fig. 8

PART 1: Average Integral of Positive Indicated Torque
Speed = 2000 RPM & Load Torque = 30 lb-ft

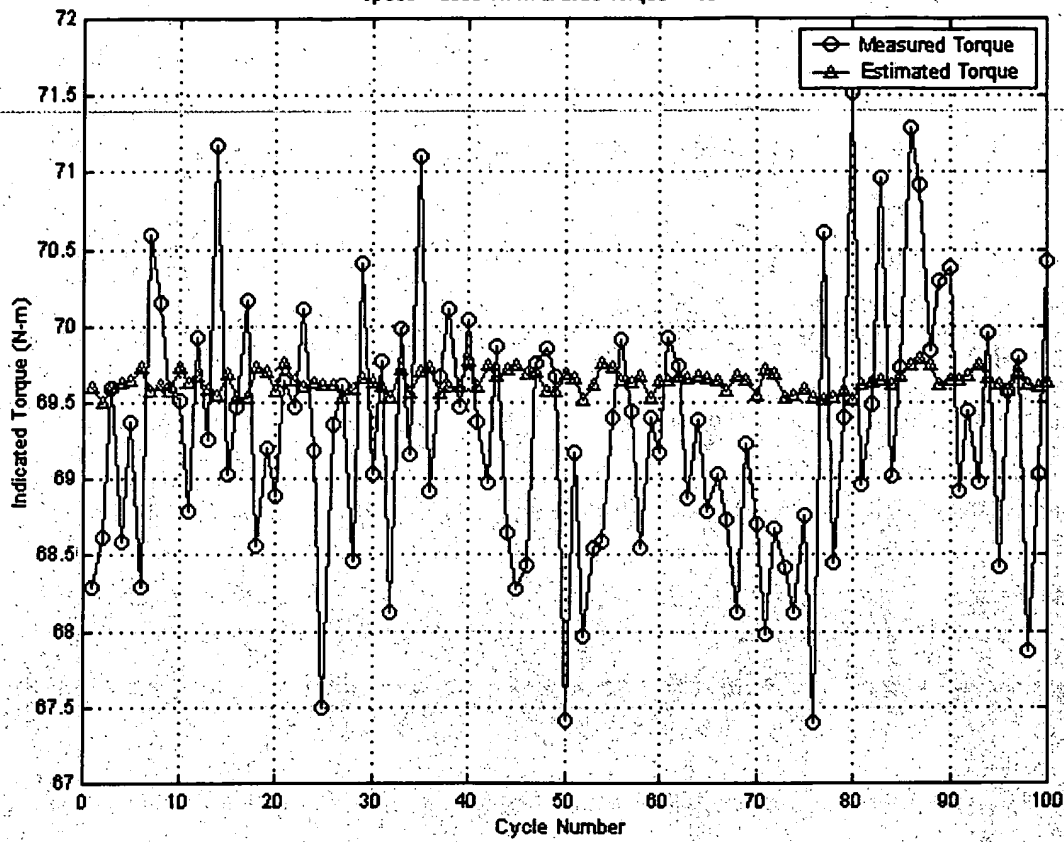


Fig. 9

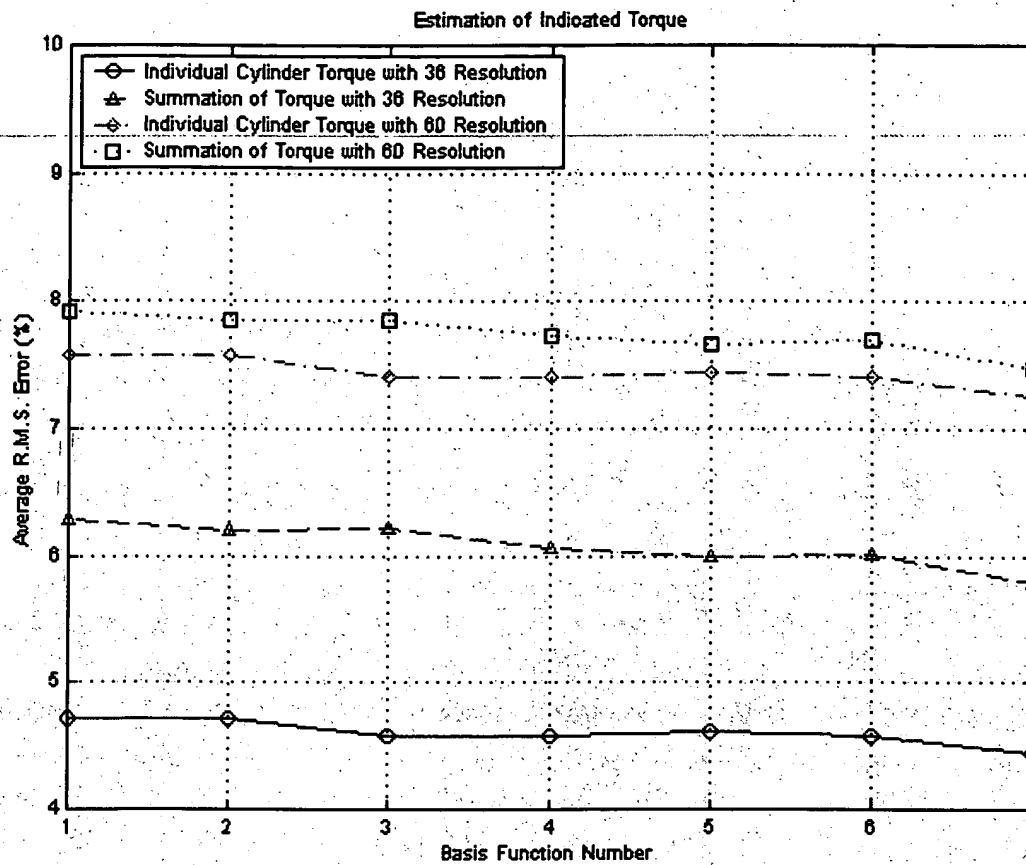


Fig. 10

Load: 40 (N·m) - Speed: 1000 (RPM)

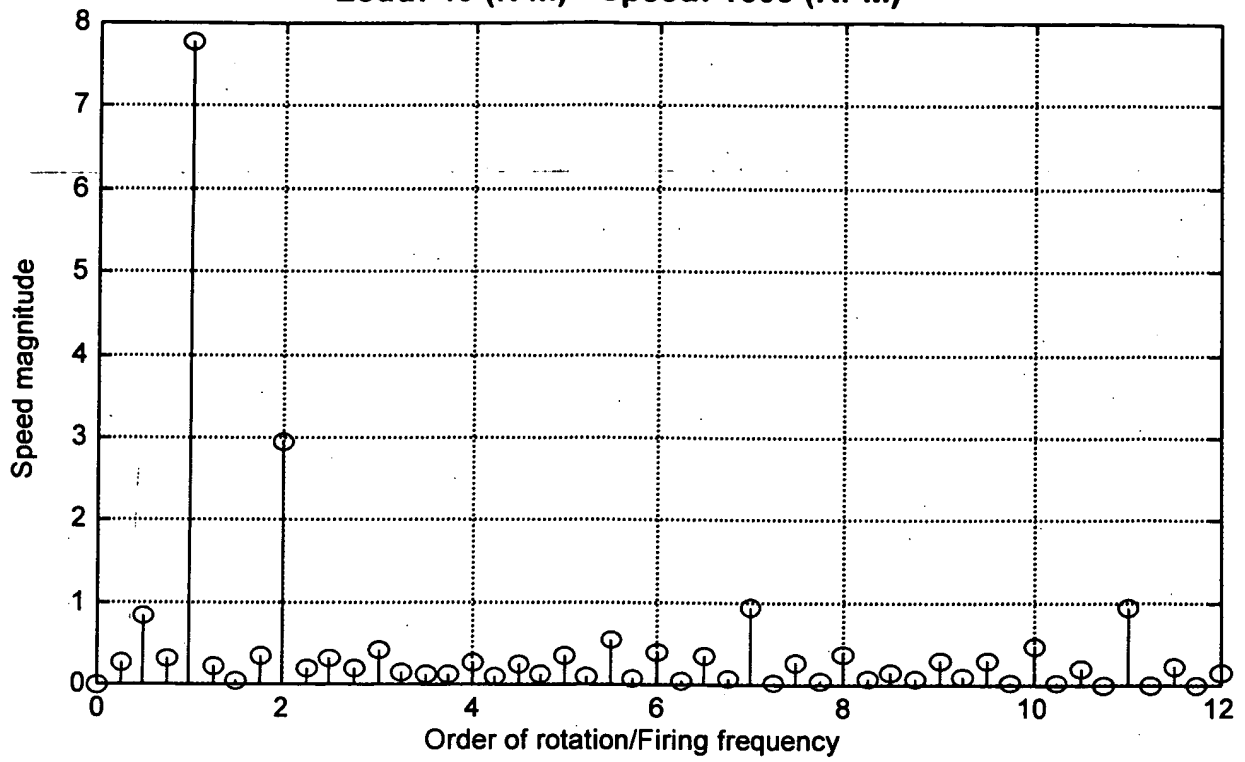


Fig. 11

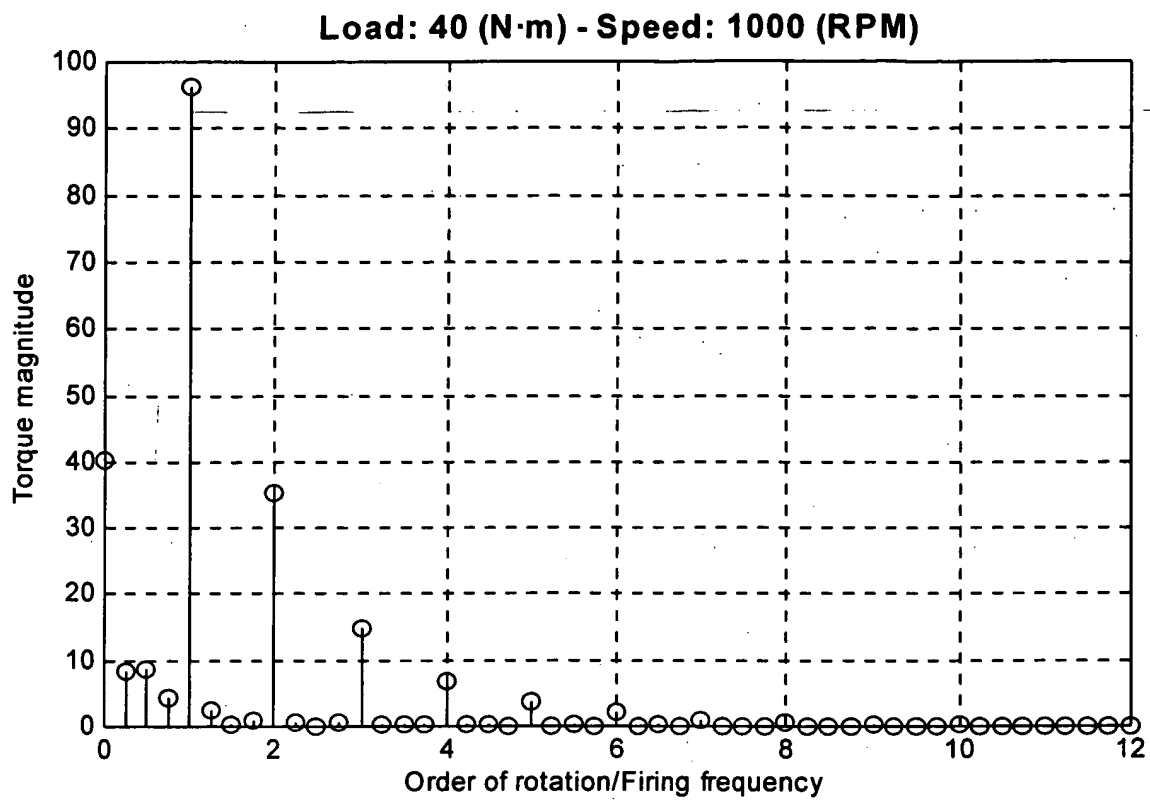
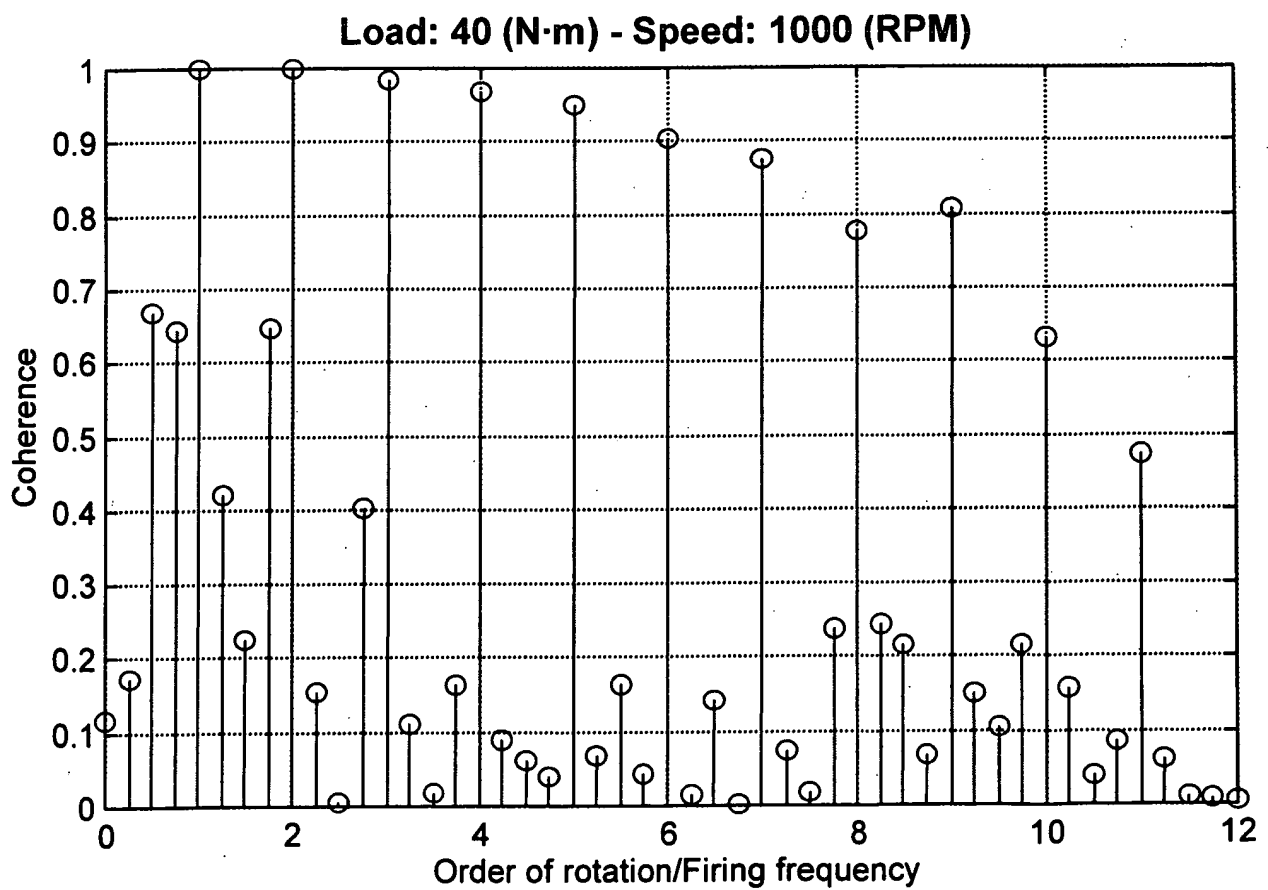


Fig. 12

Fig. 13



Relationship between average and fluctuating component of torque

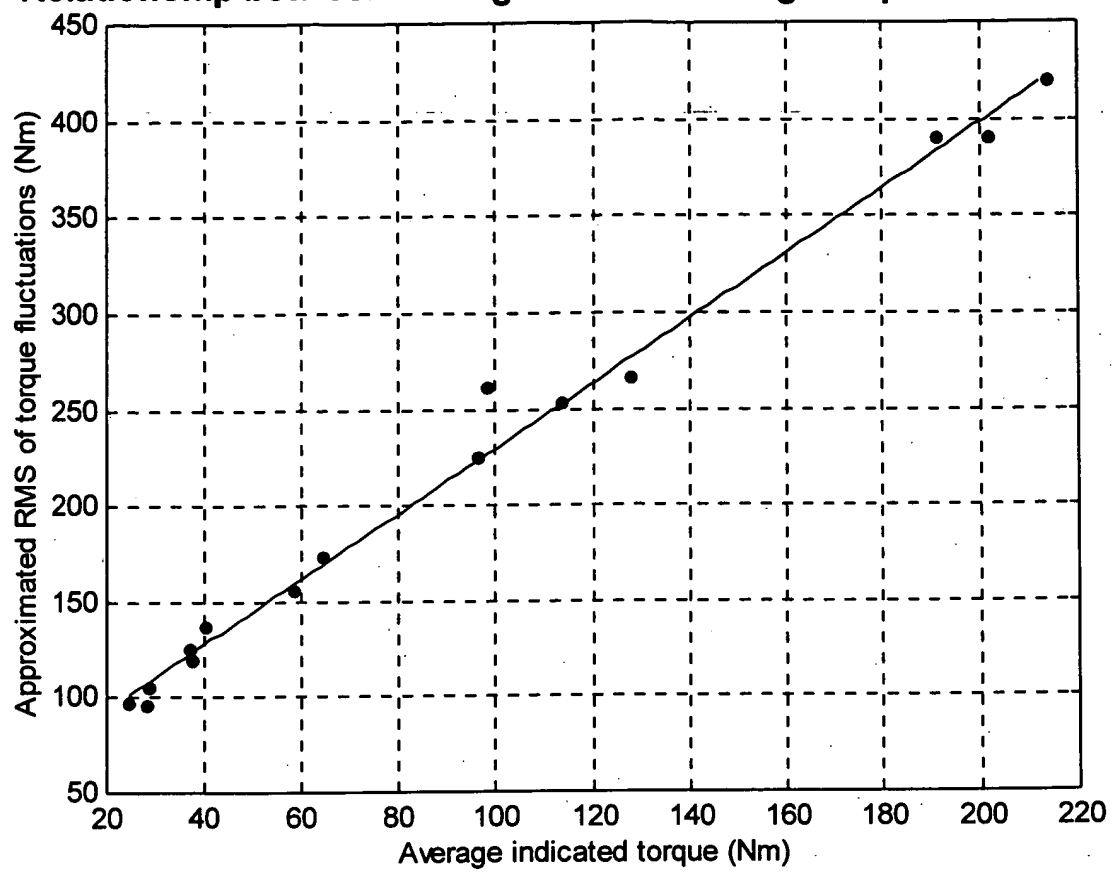


Fig. 14

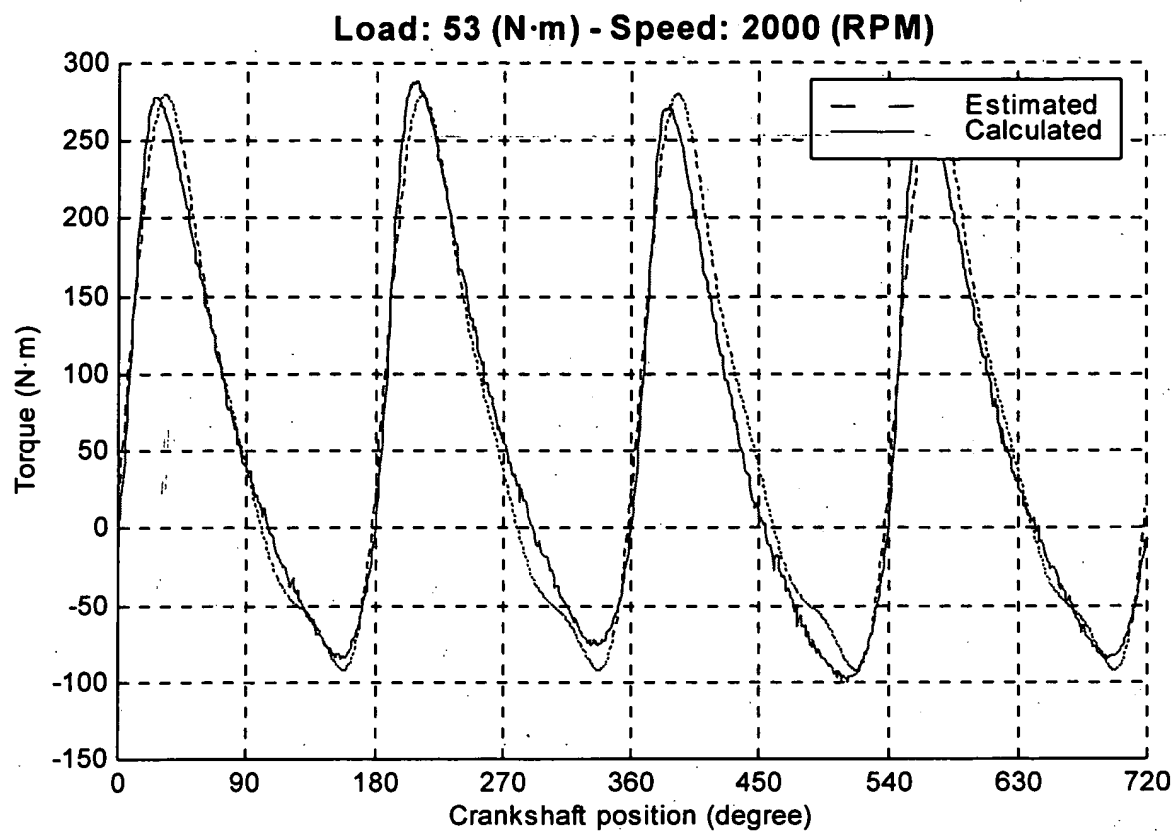


Fig. 15

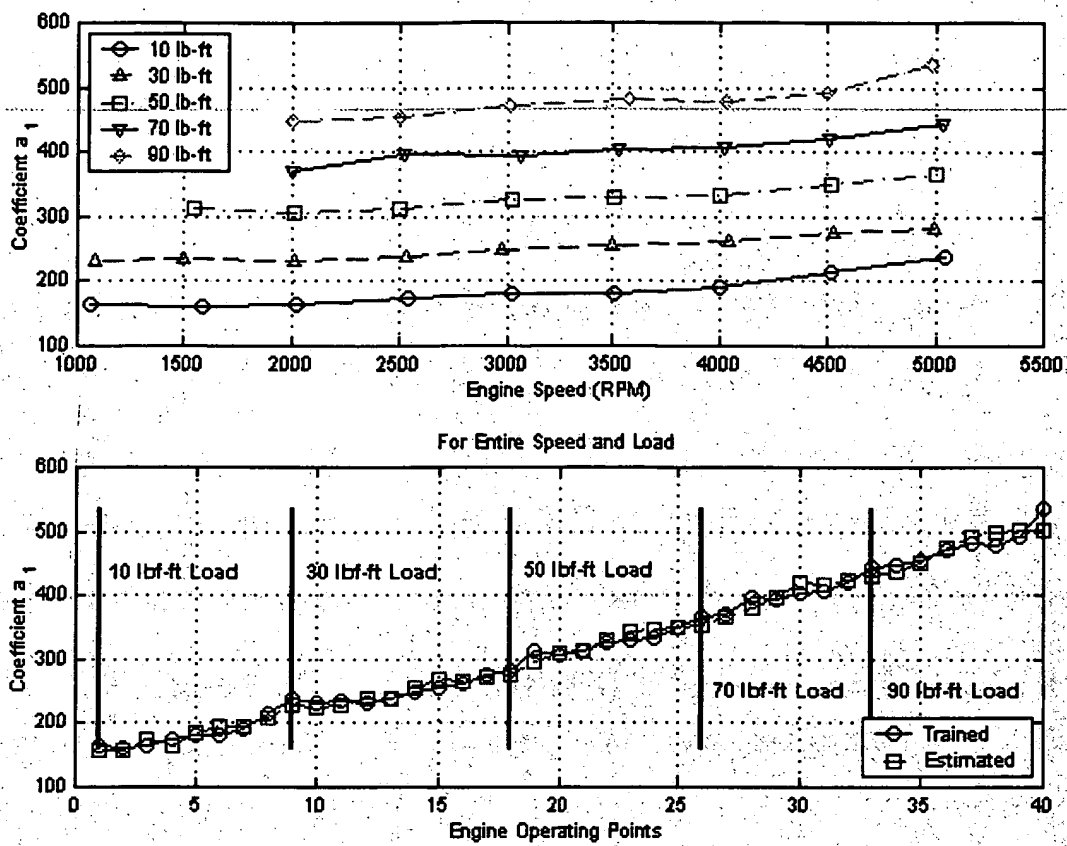


Fig. 16

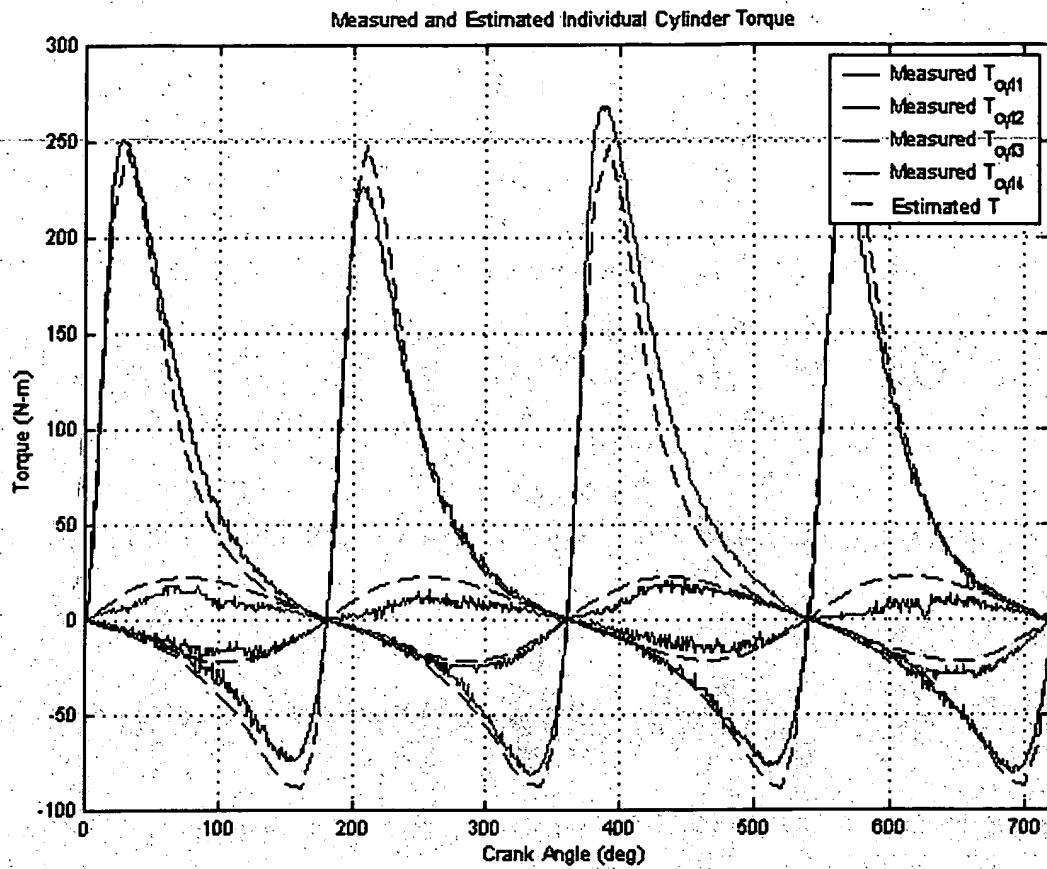


Fig. 17

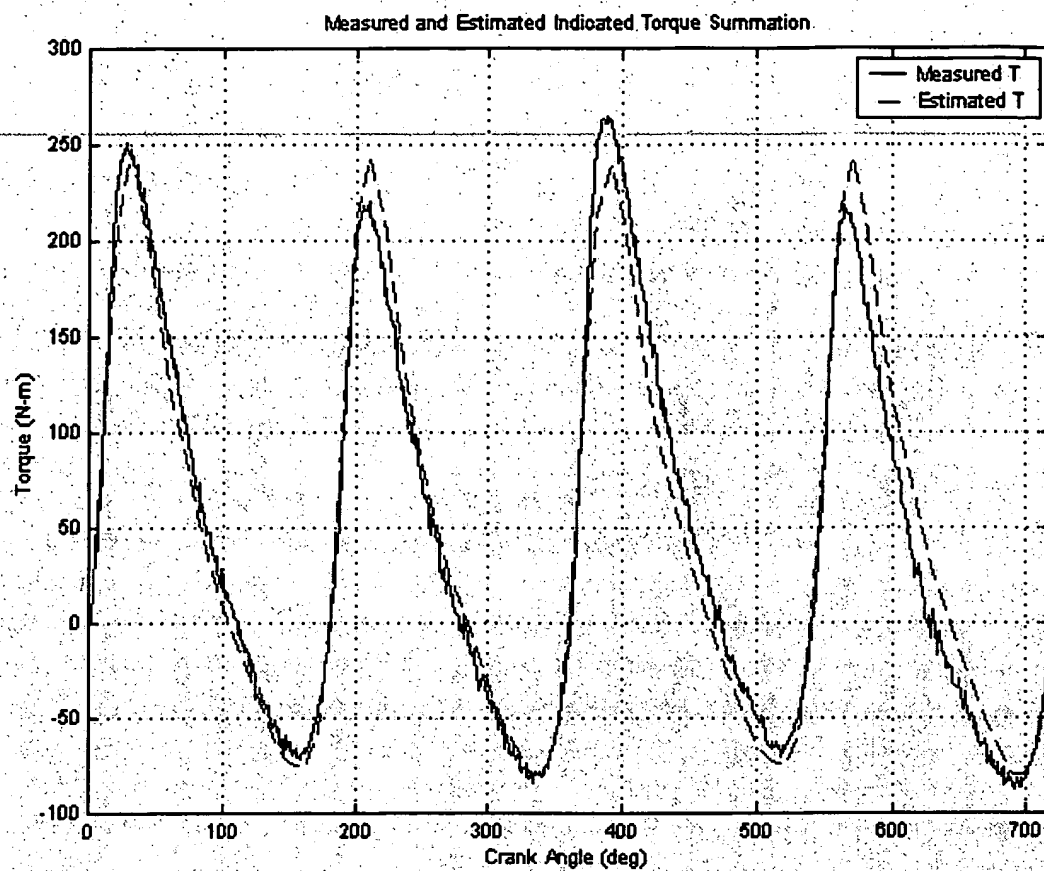


Fig. 18

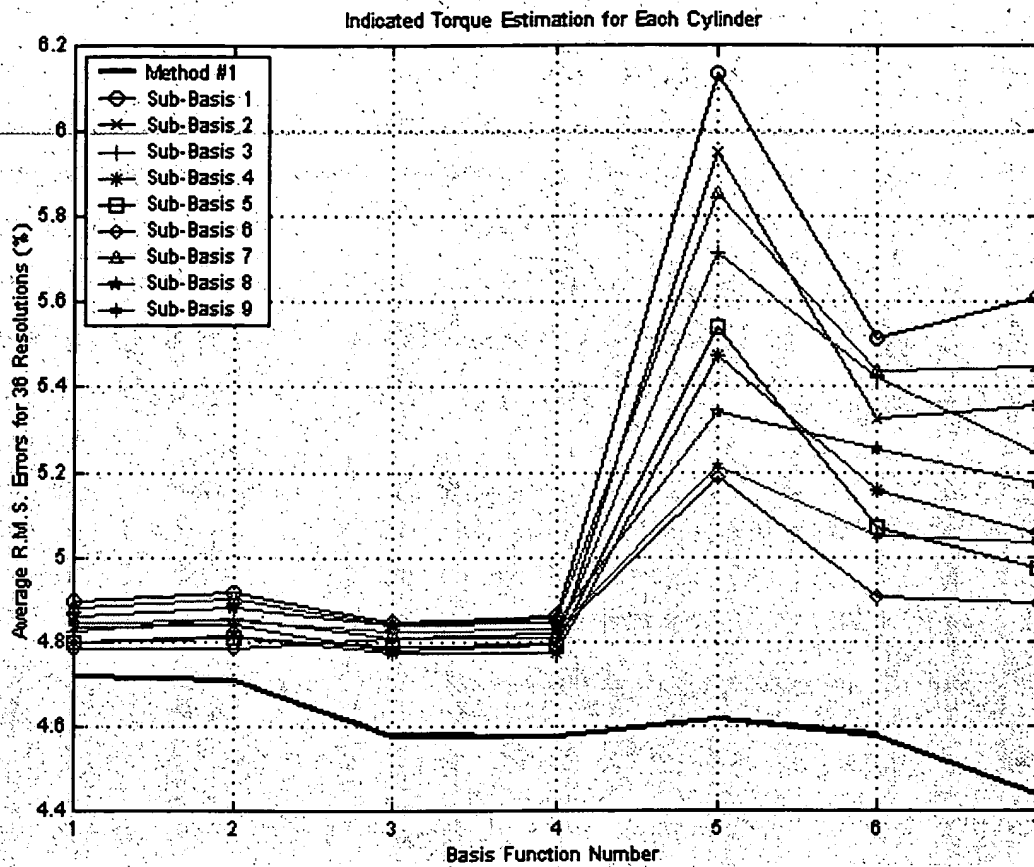


Fig. 19

Real-Time Estimation of Indicated Torque for Individual Cylinders
@ 1000 RPM and 10 lb-ft

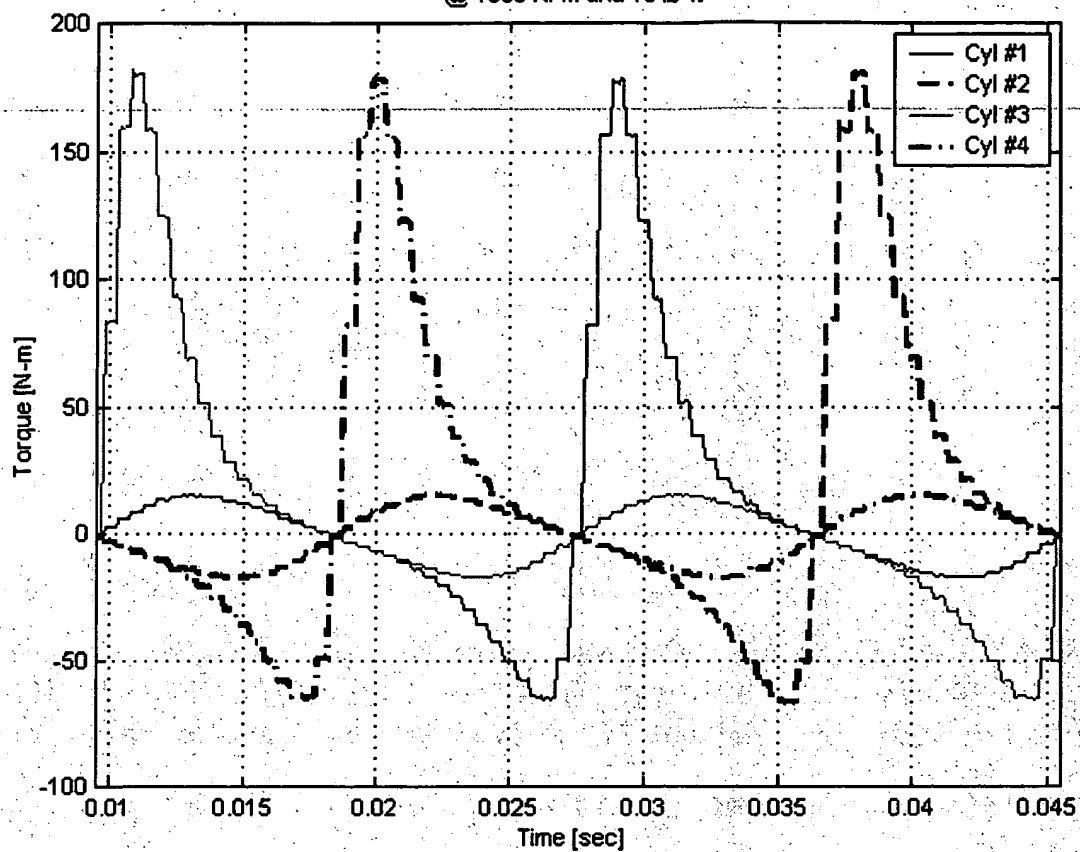


Fig. 20

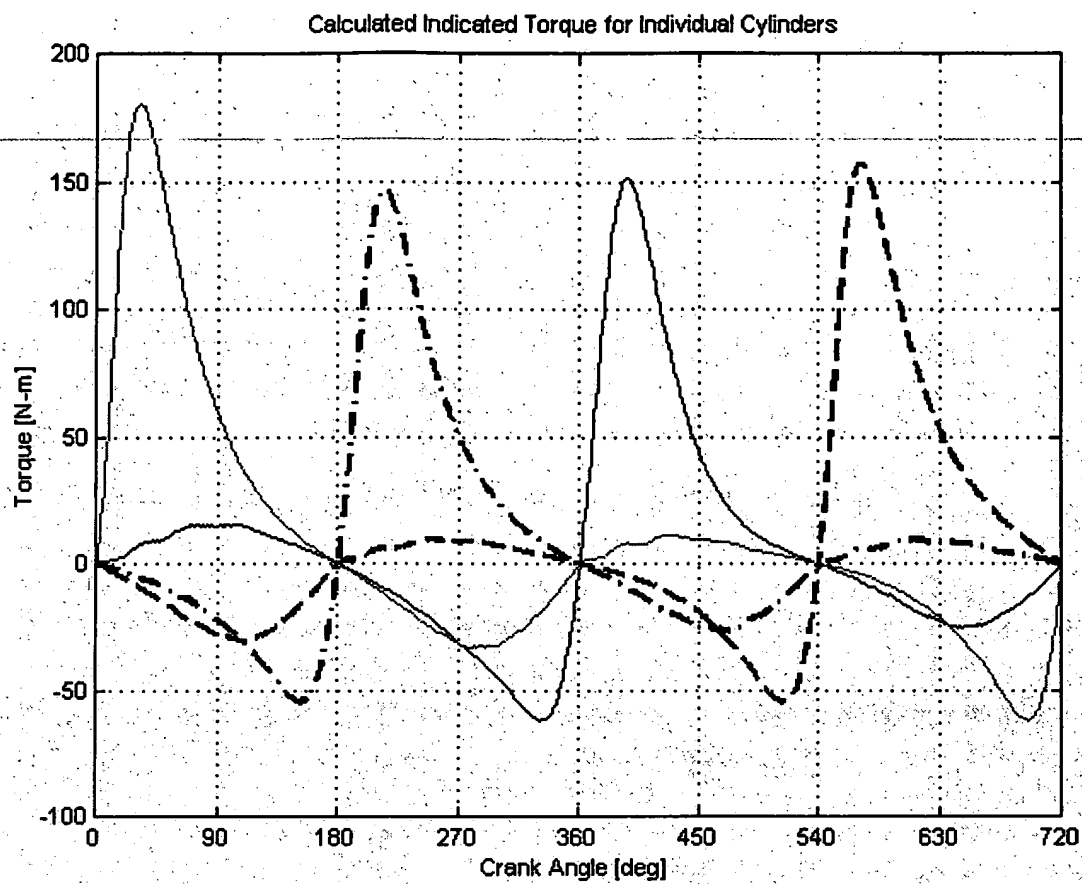


Fig. 21

Real-Time Estimation of Indicated Torque for All Cylinders
@ 1500 RPM and 30 lb-ft

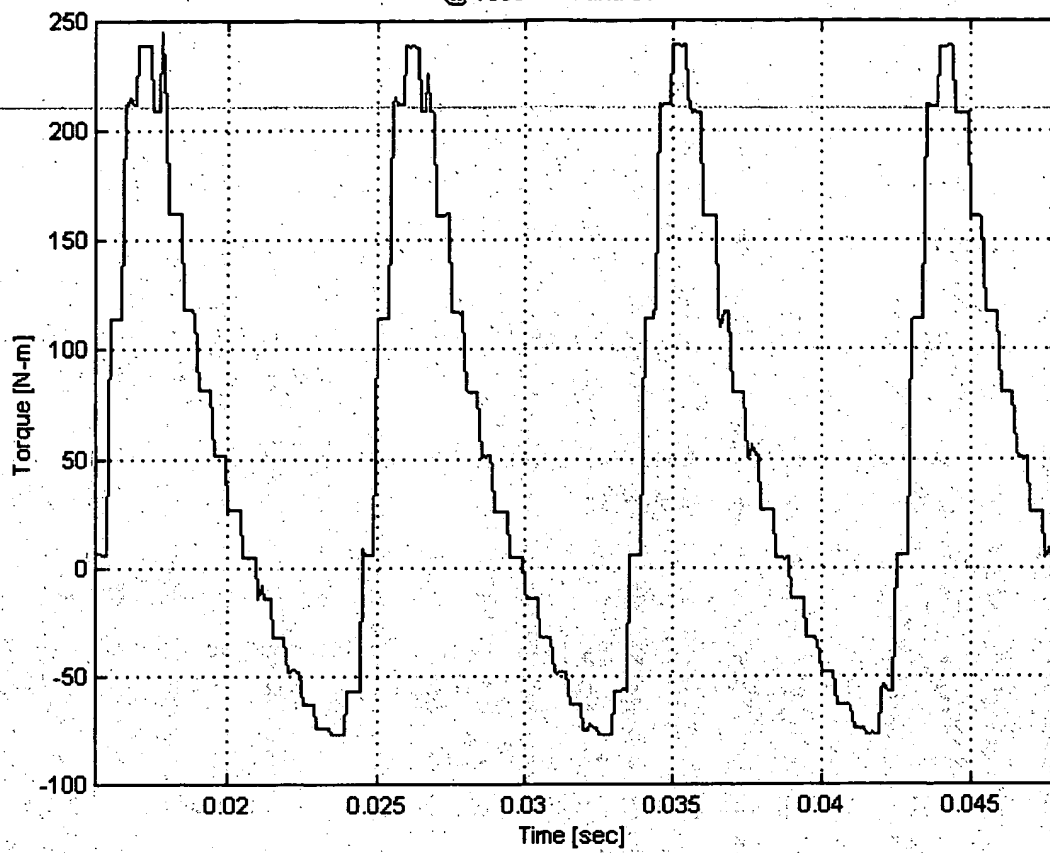


Fig. 22

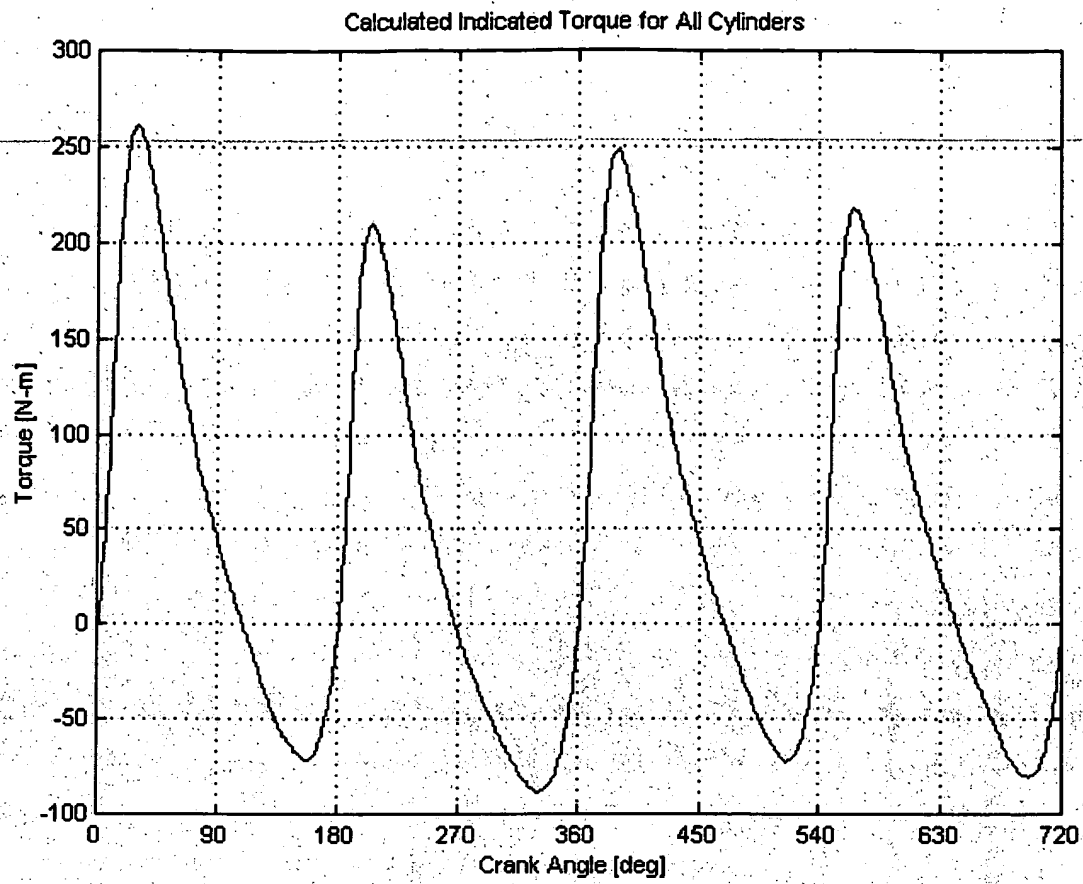


Fig. 23